

## Path Analysis of Factors which Correlated with Dysmenorrhea

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### ABSTRACT

**Background:** All women menstruate every month. There are some disorders suffered by women associated with menstruation, dysmenorrhea is among them. It interferes the women activities, even often requires the sufferers to take a rest and leave classes. The research was purposed to analyze the factors associated with dysmenorrhea.

**Subjects and Method:** This research is an analytical research with cross-sectional approach. The research was conducted on February 23 to March 23, 2016 at Senior High School of Pare, Kediri district. The population study were 452 senior high school students in the Pare who had dysmenorrhea. The samples of research were 198 students by using proportional random sampling technique. The technique for collecting the data was questionnaires. The data were analyzed using path analysis of IBM SPSS AMOS 22.

**Results:** The results showed that the fit model with CMIN = 0.77 ( $p = 0.258$ ); GFI = 0.99; NFI = 0.95; CFI = 0.99; RMSEA = 0.038. The five variables were associated by dysmenorrhea obtained three variables associated indirectly with dysmenorrheal, i.e. physical activity/exercise, BMI and family support and two variables associated with dysmenorrheal directly, i.e. psychological stress ( $b = 0.36$ ;  $p < 0.001$ ) and the coping mechanisms ( $b = -0.39$ ;  $p = 0.002$ ). Obtained of relationships, i.e; family support with coping mechanisms ( $b = 0.31$ ;  $p = 0.008$ ); coping mechanisms with psychological stress ( $b = -0.13$ ;  $p = 0.007$ ); BMI with psychological stress ( $b = -0.43$ ;  $p = 0.025$ ).

**Conclusion:** Dysmenorrhea is directly related to coping mechanisms and psychological stress. Physical activity / exercise, BMI and family support are related indirectly. It is expected to improve the coping mechanisms and family support so that the sufferers can avoid the stress that can reduce the occurrence of dysmenorrhea. It is expected to improve the coping mechanisms and family support so the sufferers can avoid the stress that can reduce the occurrence of dysmenorrhea.

**Keywords:** path analysis, dysmenorrhea, coping mechanisms, psychological stress

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### BACKGROUND

All women menstruate every month. There are some disorders experienced by women dealing with menstruation among hypermenorrhea, hipomenore, polimenore, oligomenorrhea, amenorrhea and dysmenorrhea. Dysmenorrhea is abdominal pain that is felt just before or during menstruation, it interferes the women activity, often requiring patients to rest and leave their work for hours due to dysmenorrhea (Bobak, 2004; Amimi and Suarna, 2014).

Emerging dysmenorrhea usually 2 or 3 years after menarche. Fifty percent of women never complain that pain during menstruation in adolescence dysmenorrhea peaks at age 17-25 years and be reduced or recovered after having been pregnant (Jones, 2005; Gharloghi et al., 2012). The exact cause of primary dysmenorrhea is unknown. But the primary dysmenorrhea can be caused by the hormone estrogen produced by the ovaries, the hormone that stimulates the release of prostaglandins by

the uterus. Prostaglandins are chemicals that are very similar to the hormone. The high release of prostaglandins cause uterine contractions height so that it can lead to the onset of dysmenorrhea. Other factors that could cause dysmenorrhea is the influence of the mother and the environment (Ramai-ah, 2006).

The prevalence of dysmenorrhea in adolescent girls in Indonesia were reported around 92%. This is a decline with increasing age and increasing birth (Beddu, 2015). In Surabaya found by 1.07 to 1.13% of the number of visits patients in the hospital dysmenorrhea (Baziad, 2003). Based on research conducted by Jeon et al., (2014); Kural et al., (2015); Beddu (2015); Faramarzi (2014); Zhu et al., (2010); most influential factor to dysmenorrhea in adolescent high school is health status, early menarche, menstrual time, dietary habits, body mass index (BMI), overweight, underweight, smoking, family history. Psychological factors affecting dysmenorrhea namely social support, alexithymia, anxiety, depression, stress, neuroticism, extroversion, hospitality, accuracy, openness to experience.

Factors that affect pain individuals include coping mechanisms, for example by regulating the diet and nutrition, rest and sleep, exercise, stop smoking, avoid alcohol, weight management, therapy psikopharmaco, therapy somatic, set the time correctly by planning activities before the onset menstrual pain, receive social support (family), spiritual, and develop the mindset to endure the pain (Alimul 2006; Aziato et al., 2015).

Besides the pain is also influenced by the attention, anxiety, past experience, fatigue, and social, cultural as well as how to interpret the pain. Dysmenorrhea will add anxiety to the respondent. Anxiety can increase a person's perception of pain. So

that these factors play an important role in determining a person's level of dysmenorrhea (Siahaan et al., 2012; Potter and Perry, 2006).

Dysmenorrhea is often experienced by women in the ovulation phase and immediately menarche and survive until the age of 40 years. Women experience pain due to dysmenorrhea consistent and repeatable. Adolescence is an important time for them to form their identity, develop healthy living habits, learning to balance life physically, mentally, and socially. Adolescents who experience dysmenorrhea every month, it can have an impact negatively on their lives. Therefore, it is necessary to create a supportive environment where they are encouraged to form a response to the physical, emotional, and cognitive menstruation is healthy and to foster a positive attitude towards menstruation and methods of self-care as a proactive method to overcome (Jeon, 2014; Unsal et al., 2010).

Infertility and sexual disorders can occur in primary dysmenorrhea if not handled properly (Stoelting, 2010). Dysmenorrhea in women can be cured spontaneously, either through a change of pace, after the discovery of the cause or reach psychosexual maturity, and reduced after child birth. Dysmenorrhea can be resolved by various methods of pain management both pharmacological and non-pharmacological. Methods of pharmacology is the provision of drugs analgesic while the methods of non farmalogi is without the use of drugs such as relaxation techniques, hypnosis, distraction and therapy ice and heat that can be used as an alternative method because it does not endanger students (Varney et al., 2006).

Someone who experience dysmenorrhea should not take any medication for dysmenorrhea without first consulting with your doctor, because the use of drugs which

may result in disruption of the reproductive organs. Health workers (midwives) should provide counseling and raise self-esteem in a person suffering from anxiety at the time of dysmenorrhea. Health professionals need to explain more about the physiology of menstruation, the mechanism of the onset of pain, and that explanation should be given also to the mother that her daughter often experience dysmenorrhea. Regular exercise, yoga, and meditation will provide many benefits, namely to prevent dysmenorrhea. The purpose of this research was to analyze factors associated with dysmenorrhea.

## SUBJECTS AND METHOD

This was an analytical study with cross-sectional approach. The study conducted on February 23 to March 23, 2016 at Senior High School of Pare, Kediri district. The population was high school student in Pare who experience dysmenorrhea totaling 452 students. A sample of 198 female students using proportional random sampling technique. The technique of collecting data using questionnaires. Analysis of the data path analysis using IBM SPSS AMOS 22.

## RESULTS

Characteristics specific data that is the body mass index obtained Underweight as much as 66 respondents (33.3%); normal total of 120 respondents (60.6%); Overweight as many as 10 respondents (5.1%); Obesity as much as 2 respondents (1%). Physical activity/ exercise less active gained as much as 85 respondents (42.9%); quite active as much as 84 respondents (42.4%); Active as many as 29 respondents (14.6%). Family support is obtained family does not support as many as 115 respondents (58.1%); family support as many as 83 respondents (41.9%).

Data obtained coping mechanism is less by 22 respondents (11.1%); coping mechanism quite as much as 42 respondents (21.2%); good coping mechanisms as many as 101 respondents (51%); and very good coping mechanisms as much as 33 respondents (16.7%). Normal psychological stress as much as 59 respondents (29.8%); mild stress as much as 29 respondents (14.6%); moderate stress as much as 56 respondents (28.3%); severe stress as much as 34 respondents (17.2%); very heavy stress as much as 20 respondents (10.1%). While dysmenorrhea is obtained the light dysmenorrhea as much as 102 respondents (51.5%); dysmenorrhea were as many as 85 respondents (42.9%); dysmenorrhea weigh as much as 11 respondents (5.6%).

Data analysis using Path Analysis of SPSS AMOS program version Model 22. Beginning on path analysis (Path Analysis) consists of the following phases:

### 1. Model Specifications

The early models in the analysis of the path can be seen in Figure 1.

### 2. Identify Model

Here will be the identification number of variables measured, the number of endogenous variables, exogenous variables and parameters to be estimated. The number of variables measured as 6, as many as three endogenous variables, exogenous variables as much as 3, the number of parameters as much as 9. At this stage the calculated degree of freedom ( $df$ ) = (number of measurable variables  $\times$  (number of measurable variables + 1) / 2 - (endogenous variables + exogenous variable number of parameters)) =  $(6 \times 7) / 2 - (3 + 3 + 9) = 6$ . Path analysis can be done if  $df \geq 0$ , while in the path analysis model identification at this time in get  $df$  value is 6 and is called path analysis over identified significant path analysis can be done.

### 3. Compliance Model and Parameter Estimation

The analytical model linesmade by researchers based theory is checked/ tested for suitability with the best relationship model variables according to the computer

(SPSS) is called saturation models, which are based on sample data collected investigators. Figure 2 shows the structural models after estimation using IBM SPSS AMOS 22, to obtain the value of the drawing.

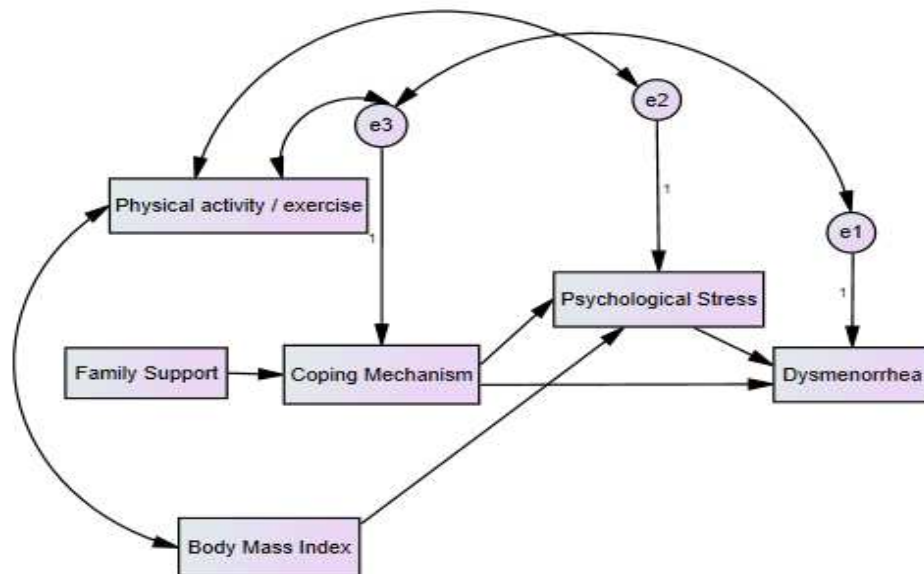


Figure 1. Model structural

**Table 1. The result of path analysis factors associated dysmenorrhea at Senior High School at Pare, Kediri District, East Java**

Endogenous Variables	Exogenous Variables	Regression Coefficient (b)	p
<b>Direct Impact</b>			
Dysmenorrhea	Psychological Stress	0.36	< 0.001
Dysmenorrhea	Coping Mechanism	- 0.39	0.002
<b>Indirect Impact</b>			
Coping Mechanism	Family Support	0.31	0.008
Psychological Stress	Coping Mechanism	-0.13	0.007
Psychological Stress	BMI	- 0.43	0.025
<b>Model Fit</b>			
CMIN	= 0.77	p= 0.258	
GFI	= 0.99	(≥ 0.90)	
NFI	= 0.95	(≥ 0.90)	
CFI	= 0.99	(≥ 0.90)	
RMSEA	= 0.038	(≤ 0.05)	

Indicators that show the suitability of the model, namely path analysis as shown in Table 1 also showed the presence of Goodness of Fit Measure (measurement model fit) that the obtained results fit index (index matching) CMIN of 0.77 with p= 0.258.

GFI= 0.99; NFI= 0.95; CFI= 0.99; RMSEA = 0.038, which means that the empirical model meets the specified criteria and otherwise in accordance with empirical data.

Estimation parameter indicates a causal relationship variable indicated by the regression coefficient (b), which has not been standardized (unstandardized). Yet standardized regression coefficients show relationship of independent variables and dependent on the original unit of measurement. In table 1 shows that the results of calculations using software SPSS 22 for windows, obtained regression coefficient b between family support is positive coping mechanism that is by 0.31 with  $p = 0.008$  was significant. The regression coefficient b between negative coping mechanisms of stress that is equal -0.13 with  $p = 0.007$  was significant. The regression coefficient b between body mass index with stress is negative in the amount of -0.43 with  $p = 0.025$

was significant. The regression coefficient b between stress and dysmenorrhea positive value in the amount of 0.36 with  $p < 0.001$  was significant. The regression coefficient b between coping mechanisms with dysmenorrhea worth negatively in the amount of -0.39 with  $p = 0.002$  was significant.

#### 4. Model Respecifications

The model in this research are in accordance with which the sample data as indicated by the model of saturation and also a regression coefficient that is worth more than zero and statistically significant already, then do not need to be regenerated because the path analysis model already obtained the appropriate model with sample data.

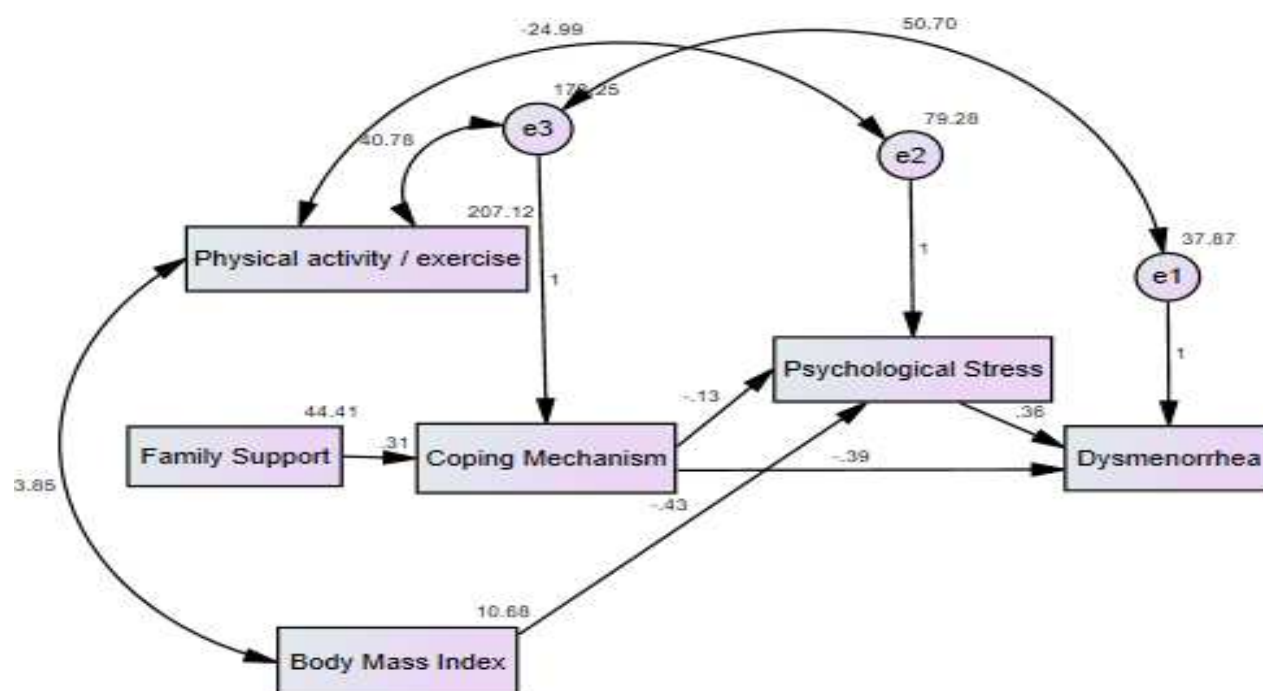


Figure 2. Model structural with unstandardized

## DISCUSSION

### 1. The relationship between family support and dysmenorrhea

Results of the analysis showed that there is a positive relationship between family sup-

port and dysmenorrhea is indirectly through coping mechanisms, and psychological stress. The influence of the relationship between family support with coping mechanism get a value  $b = 0.31$  with  $p = 0.008$  was

significant; a negative relationship through psychological stress coping mechanism and obtained the value  $b = -0.13$ , with  $p = 0.007$  was significant; a positive relationship through psychological stress and dysmenorrhea with the value  $b = 0.36$ ,  $p < 0.001$  and significant.

Family support can improve the coping mechanisms of individuals by providing emotional support and advice on alternative strategies which are based on historical experience and encourage others to focus on those aspects of a more positive (Mesarini and Astuti, 2013).

According Ernawati (2007) cited by Mesarini and Astuti (2013) that the physical and emotional tension that accompanies stress causes discomfort to the person so motivated to do something to reduce stress. Stressful conditions will provide considerable influence for the body, include dizziness, headache, chest palpitations, difficulty sleeping, changes in appetite, and could cause a delay menstruation, lengthen or shorten the menstrual cycle.

Based on this it can be concluded that there is a positive relationship between family support with dysmenorrhea but do not directly, through new coping mechanism and stress can affect the dysmenorrhea or directly from coping mechanisms to dysmenorrhea. Thus the results of this research can be said to be in line with the above research.

## 2. The relationship between physical activity/exercise and dysmenorrhea

Results of the analysis showed that there is a positive relationship between physical activity/ exercise and dysmenorrhea is indirectly. Positively influence the relationship between physical activity/ sports IMT values obtained  $b = 3.85$ ;  $p = 0.234$  otherwise insignificant; then through the IMT and psychological stress negatively to the value  $b = -0.43$  and  $p = 0.025$  was significant; the

next three positive correlation with psychological stress and dysmenorrhea value  $b = 0.36$ ;  $p < 0.001$  was significant.

Sport is one of the relaxation techniques that can be used to reduce pain. This is because during exercise the body will produce endorphins (Woo and Mc Eneaney, 2010). This hormone serves as a natural tranquilizer, that raises a sense of comfort. Endorphin levels in the body that increases can reduce pain during contractions. Sports proven to increase endorphin four to five-fold in the blood (Sylvia and Lorraine, 2006). When someone exercise, the endorphins going out and captured by receptors in the hypothalamus and limbic system that serves to regulate emotions. Increased endorphin shown to be associated closely with decreased pain, increased memory, improve appetite, sexual performance, blood pressure and breathing, so that exercise can effectively reduce the pain of dysmenorrhea (Ning, 2010). According to Priyanti and Mustikasari (2014) that different types of exercise can reduce dysmenorrhea. This is evident from the events in athletes lower dysmenorrhea.

According to research Saadah (2014) that there is no significant relationship between physical activity with dysmenorrhea in sport science student research program. Meanwhile, according to Silvana (2012) of the bivariate analysis showed that there was no relationship between individual characteristics including physical activity, BMI with primary dysmenorrhea.

Based on this it can be concluded that this research are consistent with research Saadah and Silviana that there is no direct relationship between physical activity/ exercise with dysmenorrhea. There is a positive relationship between physical activity/ exercise with dysmenorrhea but the relationship is indirect, through BMI affecting new stress affects dysmenorrhea.

### 3. The relationship between body mass index (BMI) and dysmenorrhea

Results of the analysis showed that there was a negative relationship between BMI and dysmenorrhea indirectly. The first relationship with BMI with psychological stress obtained  $b = -0.43$ ;  $p = 0.025$  was significant; then both the positive relationship through psychological stress and dysmenorrhea value obtained  $b = 0.36$ ;  $p < 0.001$  was significant.

Stress is constant and continuous, affecting the adrenal and thyroid glands produce hormones. Adrenaline, thyroxine, and cortisol as the main stress hormones will rise and significantly influence the homeostatic system. Thyroxine in addition to increasing the basal metabolic rate (BMR), also increase heart rate and frequency of breathing. Changes in lifestyle of students in times of stress can lead to a reduction in activity and eating patterns are changing (Kandasamy, 2011).

According to the research Jessica et al., (2014) that although a person's eating well and regular exercise, can be very thin because of stress. But not infrequently some cases also mentioned the stress triggers weight gain. Psychosocial stress can cause weight gain through neuro endocrine and inflammatory pathways directly, when the stress, the mind is in a dangerous physical phase and trigger the production of certain hormones. Adrenaline increases as a sign of combat stress. The body produces the hormone cortisol, which increase energy, so that a person will feel hungry. If stress occurs continuously, the higher the cortisol levels will be more hungry. Stress can lead to obesity through changes in health behaviors like diet and can influence food choices and improve the selection of foods high in fat and energy, stress has also been shown to decrease physical activity.

Based on the results that there is an inverse relationship between body mass index and stress. Supposedly people whose weight increases stress will be higher but this research is not the case because the association remained negative for BMI and psychological stress. Presumably it is due to the heavy weight increased appetite hence also reduced, as there is some argument that the stress it so desires will be reduced as well when associated with dysmenorrhea then people who experience dysmenorrhea usually no appetite. This is related to pain experienced and sometimes when a person experiencing abdominal dysmenorrhea feels unwell and experiencing nausea.

The relationship between low nutritional status (underweight) with psychological stress obtained positive correlation  $= 0.037$ ;  $p = 0.771$  which relay of the insignificant, and for the normal nutritional status by psychological stress obtained negative correlation  $= 0.041$ ;  $p = 0.659$  which means insignificant. While the relationship between the overweight and obesity with psychological stress values obtained negative correlation  $= -0.713$ ; with  $p = 0.009$ , which means significant, it is alleged physical activity/ sport is reduced so that more break and cause stress decreased.

According Madhubala (2012) that there is a relationship between dysmenorrhea and BMI with increased prevalence of dysmenorrhea in a group with low BMI. Low BMI reflects wrong diet and occur at low economic communities. Low BMI (underweight) can be caused by lack of food intake, including iron can cause anemia. Anemia is one of the factors that lead to a lack constitution endurance of pain that can occur during menstruation dysmenorrhea (Sophia et al., 2013). Being overweight can cause primary dysmenorrhea because the body contained excessive fat tissue that can lead to hyperplasia of the blood vessels of

the reproductive organs so that blood should flow in the process of menstruation interrupted. Silvana research results (2012) obtained the bivariate analysis there is no relation between the individual characteristics including BMI with dysmenorrhea.

So we can conclude that it is not in accordance with previous studies because it directly affects the BMI of dysmenorrhea. In this research there was no significant relationship between BMI and dysmenorrhea. Evident from two people who are obese suffered only mild and moderate dysmenorrhea. But there is a negative relationship between BMI and dysmenorrhea associated indirectly through psychological stress.

#### **4. The relationship between coping mechanisms and dysmenorrhea**

Results of the analysis showed that there was a negative relationship between coping mechanisms and dysmenorrhea. The relationship obtained  $b = -0.39$ ;  $p = 0.002$  was significant. So it can be concluded that there is a direct positive relationship between coping mechanisms with dysmenorrhea.

According to Kim et al., (2013) that there are significant differences in any coping styles including stress levels, health levels, and exercise regularly. Locus of control of one's health is the most powerful factor in any style of coping, but it still needs to be developed further in order to reduce menstrual pain.

In Cha and Sok research (2013) coping methods most often used in dysmenorrhea that control physical and mental conditions, taking pain-killers, improve posture, resting, compress with warm water and addressing the positive things. Someone who has an internal locus of control is effective to control the physical and mental condition. Because it is very important to solve the problem of dysmenorrhea. Edu-

cating psychological well so as to form a coping mechanism that can help one to grow the desired health management, compliance with health behavior, and are encouraged to obtain information relating to her health. Teens will be more responsible for their health and are more interested in solving the problems they are experiencing. Based on this it can be concluded that there is a relationship between coping mechanisms with dysmenorrhea.

#### **5. The relationship between psychological stress and dysmenorrhea**

Results of the analysis showed that there is a positive relationship between psychological stress and dysmenorrhea. Value relationship that is obtained  $b = 0.36$  with  $p < 0.001$  was significant.

Stress can permanently alter the hypothalamic pituitary gonadal regulation of a person's reaction. However, stress can lead to physical illness, which may arise as a result of the immune system weakens. Menstrual function is influenced by stress activates hypothalamic pituitary gonadal axis. This activation causes menstrual disorders such as irregular menstrual pattern and dysmenorrhea (Kordi et al., 2013). Stress can disrupt the endocrine system works. The endocrine system is disrupted when the myometrium in phase secretion produce prostaglandin F<sub>2</sub> which causes contraction of smooth muscles that can cause dysmenorrhea. Someone who is emotionally unstable and did not get a good description of the process of menstruation which can cause easily arise dysmenorrhea. (Priyanti and Mustikasari 2014).

According Ernawati (2007) cited by Mesarini and Astuti (2013), that the physical and emotional tension that accompanies stress causes discomfort to a person. It makes a person becomes motivated to do something to reduce stress. Stressful conditions will provide considerable influence for



the body, include dizziness, headache, chest palpitations, difficulty sleeping, changes in appetite. Based on this, it can be concluded that there is a relationship with dysmenorrhea psychological stress. Dysmenorrhea is related directly and indirectly, obtained three variables associated indirectly with dysmenorrhea is physical activity/exercise, BMI and family support. While that is directly related psychological stress, coping mechanisms. There are other relationships that family support and coping mechanisms; coping mechanisms and psychological stress; BMI and psychological stress.

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